REMARKS

Reconsideration of this application, based on this amendment and these following remarks, is respectfully requested.

Claims 1 through 14 are now in this case. No claims are amended.

The Examiner has withdrawn claims 13 through 14 from consideration in this application, on the grounds that these claims are directed to a distinct invention from the invention of the other claims. Applicant respectfully traverses this restriction, and requests that these claims be examined and considered along with the other claims in this case.

The stated basis for the restriction is that these claims require "the desired receive signal having a receive center frequency that is different from the transmit center frequency",[1] and that this limitation is not present in any of the other claims. Applicant respectfully submits that the additional limitation presented by original claim 2 in this application, which recites that the claimed radio "comprises a frequency division duplexed (FDD) radio" in fact more broadly conveys the limitation of claims 13 and 14. As is well known in the art, frequency division duplex (FDD) refers to a communications system in which transmitted and received signals are at different frequencies, thus allowing each transceiver to be operating in a duplexed mode.[2] Accordingly, the limitation that the Examiner asserts as not being present in any of the other claims, and upon which the Examiner found claims 13 and 14 to be directed to a distinct invention, in fact further limits a limitation that has been present since the filing of this application in claim 2, and also in claim 8 (as originally filed and as subsequently amended).

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[1] Office Action of June 14, 2004, page 2, ¶1.

[2] *See, e.g.*, Li et al., "Dynamic TDD and Fixed Cellular Networks" *IEEE Communications Letters*, Vol. 4, No. 7 (July 2000), pp. 218-220 ("In conventional wireless telephone systems, frequency division duplex (FDD) is implemented; one RF carrier is used for transmitting and a different RF carrier for receiving.", at p. 218). A copy of this reference is provided with this response, in support of this assertion.

Applicant therefore respectfully traverses the restriction upon which the withdrawal of claims 13 and 14 from consideration is based. Examination of these claims is respectfully requested.

Claim 1 as rejected under §102 as anticipated by the Morishige et al. reference[3]. The Examiner asserted that the reference teaches all of the elements of the claim, including that the first local oscillator signal, received by mixers in the receiver section of the radio, has a frequency equal to the center frequency of the transmitter section or a sub-harmonic thereof.[4]

Applicant respectfully traverses the rejection of claim 1, on the grounds that the teachings of the Morishige et al. reference fall short of the requirements of claim 1. A proper anticipation rejection requires that each limitation of the claim be found in a single reference.[5] Applicant submits that at least one limitation of claim 1 cannot be found from the Morishige et al. reference.

The radio of claim 1 requires a transmitter section that transmits at a center frequency. And the claimed radio also requires a receiver section including a down conversion section comprised of first and second mixers, each of which receive a local oscillator signal having a frequency equal to the center frequency of the transmitter section or a sub-harmonic thereof. Applicant respectfully submits that the Morishige et al. reference fails to disclose mixers in the receiver section of a radio that receive a local oscillator signal at the frequency required by claim 1, and indeed fails to disclose any relationship between the local oscillator frequency in the receiver and the transmitter frequency.

The location of the Morishige et al. reference cited by the Examiner does not disclose the frequency relationship required by claim 1. Rather, the reference teaches that the mixer 4 in the receiver 21 of the Morishige et al. reference "mixes the received signal with a local oscillation wave output from the local oscillator 5 *at approximately half the received signal frequency*".[6]

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[3] U.S. Patent No. 6,600,911 B1, issued July 29, 2003 to Morishige et al.
[4] Office Action, *supra*, page 3, ¶3, *citing* Morishige et al., *supra*, at column 9, lines 16 through 20.
[5] *See, e.g., In re Donohue*, 766 F.2d 531, 534, 226 USPQ 619, 621 (Fed. Cir. 1985).
[6] Morishige et al., *supra*, column 9, lines 16 through 19 (emphasis added).

Conversely, the reference teaches that its transmitter 22 includes a mixer that "mixes the baseband signals with a local oscillation wave generated by the local oscillator 5 *at approximately one half the frequency of the transmission signal*".[7] Accordingly, the Morishige et al. reference fails to disclose that the frequency of a local oscillator signal applied to a mixer in a receiver is at a frequency related to the transmission frequency. Rather, the reference discloses that the local oscillator frequency in the receiver is at approximately half the received signal frequency, and that the local oscillator frequency in the transmitter is at approximately one-half the transmission frequency, with no relationship disclosed in the reference between these two frequencies. This is consistent with Figure 6 of the reference, to which this portion of the reference refers, shows that transmitter 22 and receiver 21 have individual, and separate, local oscillators 5.

The remainder of the Morishige et al. reference also fails to disclose the claimed frequency relationship. Specifically, another embodiment of the Morishige et al. system that includes both a transmitter and receiver is described with the same local oscillator frequency relationships as discussed above.[8]

Accordingly, Applicant respectfully submits that claim 1 is not anticipated by the Morishige et al. reference, and in fact is novel over that reference. Applicant therefore respectfully traverses the §102 rejection of claim 1.

Claims 2 and 8 were rejected under §103 as unpatentable over the Morishige et al. reference, as applied against claim 1, in view of the Borras et al. reference[9]. The Examiner admitted that the Morishige et al. reference does not teach its radio as an FDD radio, but asserts that the Borras et al. reference discloses an FDD radio.[10] The asserted motivation to combine these teachings was to increase cost effectiveness of the radio,[11] and the claims were rejected.

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[7] Morishige et al., *supra*, column 9, lines 31 through 34 (emphasis added).
[8] *See* Morishige et al., *supra*, column 7, lines 14 through 39.
[9] U.S. Patent No. 5,465,409, issued November 7, 1995 to Borras et al.
[10] Office Action, *supra*, page 4, ¶5.
[11] *Id.*

Claims 3, 5, 9, and 11 were rejected under §103 as unpatentable over the Morishige et al. and Borras et al. references, further in view of the Minami reference[12]. The Examiner found that the combination of the Morishige et al. and Borras et al. references failed to disclose the first and second high pass filters as claimed by claim 3 or 5, of high pass filtering as required by claims 9 and 11, but that such filtering is disclosed by the Minami reference.[13] The alleged motivation to combine these teachings was to reduce the size of the radio while enhancing reliable operations.[14]

Claims 4, 6, 7, 10, and 12 were rejected under §103 as unpatentable over the Morishige et al., Borras et al., and Minami references, further in view of the Tolson et al. reference[15]. The Examiner admitted that the primary references lacked disclosure of the recited arrangement of high pass filters and mixers recited by these claims, but that the Tolson et al. reference provides such teachings, and that one skilled in the art would be motivated to combine these teachings in order to better enhance the performance of the radio.[16]

Applicant respectfully traverses the §103 rejection of the claims in this case, on each of these bases. Applicant further respectfully submits that claim 1 and its dependent claims, and claim 8 and its dependent claims, are all patentably distinct over the prior art of record.

As previously argued, claim 1 is directed to a radio having a receiver section that includes a first down conversion section comprising first and second mixers, said first and second mixers receiving a first local oscillator (LO) signal having a frequency equal to the center frequency of the transmitter section or a sub-harmonic thereof. This construction provides the important advantage that the largest interferer for the radio, namely its own transmit side, can be effectively removed, and image rejection efficiently achieved.[17] Other advantages include the reduction in linearity and DC offset constraints in downstream receiver circuitry, and also the

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[12] EP 0 508 401 A2, published October 14, 1992, in the name of NEC Corporation
[13] Office Action, *supra*, page 5, ¶6.
[14] *Id.*
[15] U.S. Patent No. 6,625,436 B1, issued September 23, 2003 to Tolson et al., and having a filing date of July 28, 2000.
[16] Office Action, *supra*, page 6, ¶7.
[17] Specification of S.N. 09/785,759, at page 5, lines 9 through 13.

elimination of the need to generate a separate high frequency local oscillator signal for the receiver.[18]

As discussed above relative to the novelty rejection of claim 1, Applicant submits that the Morishige et al. reference fails to disclose a radio having a receiver section including a down conversion section comprised of first and second mixers, each of which receive a local oscillator signal having a frequency equal to the center frequency of the transmitter section or a sub-harmonic thereof. Indeed, as discussed above, the Morishige et al. reference fails to disclose any relationship whatsoever between the transmission frequency and the frequency of a local oscillator in the receiver.

The other references applied against the claims also fail to disclose this relationship, as previously argued relative to the Borras et al. and Minami references. The newly cited Tolson et al. reference discloses only receiver architectures, and fails to disclose any radio including both a transmitter and a receiver, much less disclose the required relationship of the local oscillator frequency in the receiver to the center frequency of a transmitter in the radio.

In addition, Applicant submits that the Tolson et al. reference is not prior art against any of the claims in this case. This application claims priority of provisional application No. 60/215,711, filed July 3, 2000, which clearly supports the claims in this case. But the Tolson et al. reference only has a filing date[19] of July 28, 2000. Accordingly, this application claims priority to a date earlier than the effective filing date of the Tolson et al. reference, negating the Tolson et al. reference as prior art in this case.

Applicant further respectfully traverses the §103 rejection of claims in this case, because the rejection is based on an alleged motivation that has, in each instance, exactly no connection to the alleged combination. How would the combination of the Morishige et al. teachings with the FDD radio of the Borras et al. reference result in increased cost effectiveness of the radio?[20] How would the combination of the Minami high pass filter teachings reduce the size of the

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[18] Specification, *supra*, page 5, lines 13 through 16.
[19] For purposes of establishing prior art under §102.
[20] Office Action, *supra*, page 4, ¶5.

radio while enhancing reliable operations?[21] How would the combination of the arrangement of high pass filters and mixers alleged to be present in the Tolson et al. reference better enhance the performance of the radio?[22] These bases of motivation are certainly not self-evident, and no rationale for the motivation is provided by the Examiner. It is reasonable to conclude, therefore, that these alleged motivational bases are not valid.

Accordingly, Applicant respectfully traverses the §103 rejection, and submits that the combined teachings of the applied references fall short of the requirements of claim 1 and its dependent claims.

Applicant further respectfully submits that there is no suggestion to modify these teachings in such a manner as to reach claim 1 and its dependent claims. As mentioned above, an important advantage of the radio of claim 1 is the ability to efficiently remove, from the received signal, interference from the radio's own transmitter, which is the largest source of interference for the radio. But none of the applied references even mention the need to eliminate, in the receiver, interference from the transmitter side of the same radio. As such, there is simply no motivation whatsoever from these references to consider applying a transmission frequency or harmonic to a mixer in the receiver for any purpose; rather, each of these references use only frequencies related to the receive transmission frequency. Accordingly, Applicant respectfully submits that, absent any suggestion or motivation from the prior art to apply a transmission frequency to the receive side of a radio, claim 1 and its dependent claims are all patentably distinct over the prior art of record in this case.

Applicant further respectfully submits that claims 2 through 7 and 13 are further patentably distinct over the combined teachings of the applied references.

Claim 2 and its dependent claim 13 require that the radio is a frequency division duplexed (FDD) radio. As discussed above relative to the restriction requirement, and as more specifically specified in claim 13, frequency division duplexing refers to communications in

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[21] Office Action, *supra*, page 5, ¶6.
[22] Office Action, *supra*, page 6, ¶7.

which the transmit and receive frequencies differ from one another. As mentioned above, there is no suggestion from the prior art to apply a transmission frequency as a local oscillator frequency in the receive side of the radio. This suggestion is even further absent from the prior art for radios in which the transmit frequency differs from the receive frequency, again because the cited references teach only operations, on the receive side, that relate to the receive frequencies.[23] For this reason, Applicant respectfully submits that claims 2 and 13 are further patentably distinct over the prior art of record in this case.

Claim 3 and its dependent claims require that the radio further include high pass filters coupled to the outputs of the respective mixers. As described in the specification,[24] the mixing of the center transmit frequency (or a harmonic) with the received signal causes interference from the transmitter to be converted to DC, and easily filtered out by conventional high pass filters, including filters as simple as DC blocking capacitors (claim 4).

There is especially no suggestion from the applied references to provide such mixing and filtering. This lack of suggestion is especially evident from the Morishige et al. reference itself, which applies low pass filters 6 after its mixers[25], and from the Minami et al. reference, which applies low pass filters after its mixers[26]. Despite the absence of suggestion to substitute high pass filters for these low pass filters in order to block the DC component of the transmission leakage interference as results from the claimed invention, this substitution would in fact destroy the operation of the systems disclosed in these references. This renders the modification of the applied references in such a manner as to reach claim 3 and its dependent claims even less obvious.

Accordingly, Applicant submits that claim 3 and its dependent claims are further patentably distinct over the prior art of record in this case.

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[23] *See, e.g.*, Morishige et al., *supra*, at column 7, lines 14 through 28 and column 9, lines 9 through 25; Borras et al., *supra*, column 1, lines 44 through 58.
[24] Specification, *supra*, at page 3, lines 10 through 14; page 4, lines 1 through 9.
[25] *See, e.g.*, Morishige et al., *supra*, column 7, lines 23 through 28.
[26] Minami, *supra*, column 3, lines 2 through 16.

Independent claim 8 requires the step of providing a local oscillator (LO) signal to a first down conversion section of an FDD radio receiver, where the LO signal has a frequency equal to the center frequency of the transmit signal or a sub-harmonic thereof. The claim further requires the step of filtering the output of the first down conversion section of the receiver. The method of claim 8 provides the same important advantages as discussed above relative to claim 1, including the elimination of interference from the most significant interferer in the radio, namely its own transmitter.

For the same reasons as discussed above relative to claim 2, Applicant respectfully submits that claim 8 and its dependent claims are patentably distinct over the prior art of record, and respectfully traverse the §103 rejection of these claims.

As discussed above relative to claim 1, Applicant submits that the Morishige et al. reference fails to disclose the providing of a local oscillator signal, to a down conversion section of a receiver, in which the frequency of the local oscillator signal is equal to the center frequency of the transmitter section or a sub-harmonic thereof. As discussed above, the Morishige et al. reference fails to disclose any relationship whatsoever between the transmission frequency and the frequency of a local oscillator in the receiver, nor do any of the other references applied against the claims in this case.

Furthermore, Applicant respectfully traverses the rejection of claim 8 and its dependent claims on the grounds that the alleged grounds of motivation to combine the references to render the claims obvious are conclusory at best. As discussed above relative to claim 1 and its dependent claims, the alleged motivation for these combinations have no self-evident or stated relationship to the teachings that are combined or modified. Applicant therefore traverses the §103 rejection of claim 8 and its dependent claims, and challenges whether the stated motivating reasons are valid for making the combination.

And as argued above relative to claim 2, claim 8 requires that its method is directed to a frequency division duplexed (FDD) radio, namely radio communications in which the transmit and receive frequencies differ from one another. If there is no suggestion from the prior art to

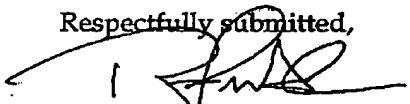
apply a transmission frequency as a local oscillator frequency in the receive side of the radio, as discussed above, there is even less suggestion to provide that transmission frequency to the receiver in radios in which the transmit frequency differs from the receive frequency, such as the FDD radio to which the method of claim 8 applies. Applicant therefore respectfully submits that claim 8 and its dependent claims are further patentably distinct over the prior art of record in this case.

Applicant therefore respectfully traverses the §103 rejection of claim 8 and its dependent claims, and asserts that these claims are in fact patentably distinct over the prior art in this case.

Applicant further submits, for similar reasons, that claim 14 is novel and patentably distinct over the prior art of record. As requested above, Applicant submits that the withdrawal of claim 14 is unwarranted and incorrect. Favorable consideration of claim 14 is respectfully requested.

For these reasons, Applicant respectfully submits that the claims in this case are allowable. Reconsideration of this application is therefore respectfully requested.

Respectfully submitted,



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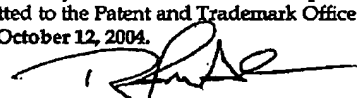

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